



Fission Product Extraction Process (FPEX): Cesium & Strontium extraction process reduces waste

Historically, progress in the world is marked by developing key technologies. Antiquated methods are replaced by marvels like internal combustion engines, microwaves, and digital systems. Global energy needs are growing rapidly and require major advancements in fossil fuel, renewable systems and nuclear power to meet world demand. Researchers at the Idaho National Laboratory are racing toward advancements in nuclear energy and now have developed FPEX, also called the Fission Product Extraction Process.

FPEX is a key process that simultaneously and synergistically extracts Cesium and Strontium from spent nuclear fuel. Using an environmentally-friendly and commercially-available solvent, scientists now can remove these two valuable elements for reuse.

Strontium isotopes are widely used in medical research and thermal energy applications for daily and emergent power in remote areas. Cesium may prove very valuable in radiation processing of natural and synthetic materials, creating agricultural soil conditioners and fertilizers, as well as disinfecting water and food. Not only are the two elements recyclable with this process, but the solvent also is reusable.

Until now, processes normally extracted these elements one at a time, doubling processing time, labor, risk to workers, and cost. FPEX extracts both Cesium and Strontium in a single process, but delivers significant benefits beyond efficient processing.

A key issue for nuclear power electrical generation is the management and storage of spent nuclear fuel. FPEX improves the storage situation by a factor of ten.

Removing the Cesium and Strontium for recycling eliminates a major heat source in storage, while also reducing both the space and time required for storage. This breakthrough alone could extend the life of America's planned national repository at Yucca Mountain Nevada from 30 years to 300 years.

It is a key advancement that could save the U.S. and other countries billions of dollars. It also will make nuclear power more attractive throughout the world.

“For nations that recycle spent nuclear fuel, FPEX offers the ability to remove, recycle, and store these isotopes for the short-term in a less expensive and environmentally responsible manner,” said INL scientist Catherine Riddle.

FPEX offers an important advancement that can increase the availability of energy and important isotopes for the world to use.